ZANZIBAR GOVERNMENT

ANNUAL

MEDICAL AND SANITARY REPORT

FOR THE

year ended 31st December, 1939

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Office of the

Senior Medical Officer in Charge,

Medical and Sanitary Services,

Zanzibar, 1st May, 1940.

Sir,

I have the honour to submit for the information of His Excellency the British Resident and for transmission to the Right Honourable the Secretary of State, the Medical Report on the Health and Sanitary Conditions of the Zanzibar Protectorate for the year 1939, together with the Returns, etc., appended thereto.

I have the honour to be,

Sir,

Your obedient servant,

S. W. T. LEE,

Senior Medical Officer in Charge,
Medical and Sanitary Services.

The Honourable,

Chief Secretary to the Government,

Zanzibar.

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SECTION I.

ADMINISTRATION.

GENERAL REVIEW.

In view of the need for economy, this annual report has been reduced in size. The maps of the Protectorate have been omitted, together with the usual graphs relating to the incidence of disease.

Staff.—Dr. W. Leslie Webb, the Director of Medical Services, retired in March, and Dr. S. W. T. Lee acted as Director of Medical Services till June, when he was appointed Senior Medical Officer in Charge, Medical and Sanitary Services. Dr. S. M. Vassallo, who has been the Specialist Officer in Zanzibar for fourteen years, also retired; he will be a loss to Zanzibar where his professional skill and kindliness of manner will be long remembered. His post was filled by Dr. C. E. Roberts, who arrived in November from Uganda.

The establishment of the department was reduced by one Senior Medical Officer (Dr. Lee), and the post of Pathologist remained vacant during the year. That is to say, during the last five years the total number of doctors has been reduced from thirteen to ten despite the addition to the staff of two Woman Medical Officers.

In 1940 it is intended to fill the Pathologist's post by transferring one Medical Officer, who has been acting in that capacity, but no more Medical Officers will be appointed. The Pathologist engages in other occupations, such as Medical Officer in Charge, Prison, Asylum, Police Lines and town school children. Zanzibar is a small place and cannot afford the services of a man engaged solely on laboratory work. Despite the reduction of the laboratory staff by one senior laboratory assistant, it has been carried on most efficiently during the year.

Training of non-European Personnel.—That of Sanitary Inspectors continued. A class of ten started the year, but the course proved too difficult for three. In future it is not proposed to attempt training men for this type of work—or any graded staff posts—who are not in possession of a secondary school leaving certificate. Military needs interferred with the course and made it necessary to continue it into 1940.

Male probationer nursing orderlies and probationer female nurses started training on a regular basis during the latter part of the year. At the close of the year twenty-two boys and twenty-five girls were under training as compared with eight in 1938. A three-year syllabus, similar to that in use at Mulago, in Uganda, was adapted to local use, but considerable emphasis is placed on the fact that the aim of training is to produce practical male and female nurses; if the syllabus shows signs of failing to achieve this result it will be modified as necessary.

So far as the male probationers are concerned, there has been little difficulty in recruiting boys of a good type who have passed Standard VI and know a little English. The need for releasing older trained men for service with the Zanzibar Field Ambulance Company made it possible to engage additional probationers, who have, after six months' training, outstripped the men they have replaced.

The girls have been more difficult to get. The supply of young women who have passed Standard VI is limited, but the main obstacle is that Zanzibar is a Mohammedan country, where it is not the custom for women—at any rate educated girls of good family—to undertake work outside the home. A certain amount of prejudice and criticism has had to be overcome, but it appears that there will be little difficulty in the future in keeping up a supply of probationers, as the first batch have been handled very sympathetically. The girls in training are Arabs and Africans, but an endeavour is also being made to attract Asiatic probationers; three attempted the course, but for various reasons abandoned it.

The training scheme outlined above is in force in Zanzibar and in Pemba. Medical Officers in Pemba have been instructed that, emergencies apart, their main occupation must be the training of probationers. Both the Sisters and Medical Officers are keen, and because the numbers of probationers are smaller and individual attention can be given to each it is probable that they will become as efficient as those trained in Zanzibar.

In Pemba it has been very hard to obtain boys and girls of Standard VI. Where a low standard has been accepted, educational deficiencies are being made good by special classes in English, arithmetic, etc.

There is every hope that in two to three years all Zanzibar units will be staffed by trained male and female nurses who are competent to carry on nursing work of a high standard; already, thanks chiefly to the new matron (Miss Miller), the hospital staffs show a very marked improvement over last year.

It is logical to expect that ultimately all nursing will be done by women—it is women's work—so that although the transition period must be gone through, where male nursing orderlies are employed most, stress is put on training women and engaging as many as the department can afford.

An Arab midwife was engaged during the year as a staff nurse. She went on with her nurse's training and is doing very well. Girls employed in the Women's Clinic as dispensers and dressers are also progressing well and are taking the full nursing course.

A proposal to train two Africans or Arabs as compounders (dispensers) in Kenya for a period of three years had to be abandoned, as two men of the requisite education could not be found. It is expected in 1940 to proceed with this scheme, and local men will replace Asiatics of Indian domicile who are due to retire in a few years.

An Arab who was sent to Beirut to train as a dental surgeon was reported on very favourably during the year, and he is expected to qualify and to take up his duties in the Zanzibar service in 1940.

A suggestion that local girls showing particular talent might also be sent to Beirut or Cairo is regarded favourably by Government, and there is little doubt something will be done on these lines when girls are available, and the financial situation is easier.

Some training in midwifery for probationers was started this year at Chake Chake and Zanzibar. Despite adverse financial conditions, it is expected a building near the Zanzibar Hospital—the old eye clinic—will be adapted for use as a maternity home in 1940. This will provide ten maternity beds and enable a special class for midwives to be started. It is hoped to train village girls and better educated town girls for one to two years, when they will have to pass some type of "C.M.B." examination. Experience will show what can be done with country girls, but it is certain that there is a very great need for midwives in the country districts, and it is from these areas that it is difficult to obtain educated girls. The scheme outlined above may grow once it is started —as did that for training girls as nurses—the important thing is to get a start made, give practical training within the comprehension of the trainees and modify ideas as progress is made.

Probationers are to be examined—thanks to the courtesy of the Director of Medical Services of Tanganyika Territory—by a Matron from that territory. The first examination was held in December, and of seventeen candidates who had completed a year's training fifteen passed. The examiner considered the standard was high and the girls were more intelligent than the boys.

Arrangements were made this year for an African to proceed to Mulago to qualify as a Senior Medical Assistant to take the place of an Indian Sub-Assistant Surgeon due to retire in a few years. In this connexion it is worth recording that the two Arabs who qualified at Mulago five years ago have been given a great deal more responsibility this year. One is becoming proficient at minor surgery and is taking an interest in X-ray; the other is in charge of a small station hospital (Mkoani) and is doing well and taking a practical interest in sanitation and public health.

As in the past, details of the more junior staff—mosquito searchers, porters, sanitary orderlies—have been afforded opportunities of obtaining more education at night schools. Those who do well get a chance to become probationers, junior clerks, laboratory assistants and so forth; in fact there is a definite opportunity for an intelligent and hard-working boy to rise from pushing a refuse cart to becoming a sanitary inspector in the graded staff or a trained nursing orderly on a good salary. This is appreciated.

Miscellaneous Activities.—With training of staff it is relevant to record that the work is facilitated and recruiting made easier by two things. The first is the existence of a very large sports club, which is almost entirely the outcome of the enthusiasm of the Sanitary Superintendent (Mr. Lavers). The department—in which is included some four hundred porters, who clean the streets and dispose of refuse—runs fifteen football teams. It has its own field and is levelling a better one, and the club is building a pavilion—the members do the work. In addition, cricket and volley ball are played.

The second is a system of co-operative departmental buying and selling. Rice, sugar and other every-day commodities are ordered direct from wholesellers and retailed periodically at a little above cost price to all members of the department. The monthly sales are up to £150 and rising. The departmental employees appreciate the fact no profit—beyond that necessary to cover minor losses—is made, and there is no question of advances being given and heavy interest being charged. Purchases are by credit—up to half what a man has earned at the date credit is given—or by cash. The scheme may become so big that it will have to be turned over to a firm.

These privileges have fostered a real *esprit de corps* which showed itself when seventy volunteers were wanted for a Field Ambulance Company. Some four hundred men volunteered and stipulated only that they should have their own officers with them. This was a very interesting gesture, as no information was available as to pay, conditions of service, uniforms, corps they would join, or anything else.

First-Aid Training.—As an appendix to he training of staff, it should be recorded that four hundred and fifty men—sweepers, porters and volunteers —have been trained in first-aid this year. They comprise part of Zanzibar's "A.R.P." organization. First, all sanitary inspectors were trained and they taught their headmen and mosquito searchers and, in turn, they trained the porters and volunteers under them. The result has been that seven first-aid posts are available in Zanzibar Town, mainly in charge of private doctors, and all can mobilize fifty to seventy men under their own sanitary inspectors and headmen. They are equipped with stretchers, first-aid haversacks and splints, and all know how to use them. They are distinguished by red cross badges, and each post rehearses its mobilization plans and continues training each week. Nobody gets paid anything for this. The organization was inspected several times by His Excellency the British Resident, who was pleased with the efficiency of the personnel.

Field Ambulance Company.—A Field Ambulance Company was formed in a little over two months. It is officered by local Medical Officers, and the N.C.Os. are African Sanitary Inspectors, Rural Dispensary Attendants and so forth. They were fitted out in every detail by goods bought or made in Zanzibar, and in the help given to equip them everybody was remarkable—the P.W.D. workshop staff, under Mr. Wheatley, were indefatigable.

This locally raised and equipped unit was inspected by His Highness the Sultan, on several occasions by His Excellency the British Resident, and by the Brigadier Commanding the Lines of Communication Area in Tanganyika Territory. The latter complimented the department on the efficiency of the unit and the fact that it had been possible to equip it by purely local efforts. The Company went overseas in November, and has had an excellent record of efficiency.

Wartime Medical Organization.—Of the ten Medical Officers employed in the department it is hoped to release four in rotation for naval or military service. The gaps left in the service will be bridged by a general redistribution of work and by one European private practitioner volunteering for part-time Government work. The situation is made easier by a revision of leave conditions, which means longer tours during the war. The depleted department is carrying on efficiently and proposes to extend its activities as regards social services in 1940. This is made possible by the patriotic attitude adopted by all members of the staff who are willing to work as required to enable other officers to serve with the forces. The subordinate staff, too, have taken up additional burdens. Every European Officer and Sister in the department volunteered for war service in any capacity.

Services for Women and Children.—It is unfortunate that graphs cannot be introduced to show the expansion of these services. In Zanzibar the women's clinic is crowded out every day by one hundred and fifty to two hundred women and children, and special clinics are held for expectant mothers, children, sufferers from venereal diseases and so forth. In four country dispensaries the same work is being carried on—mostly under the control of a specially trained sister who is supervised by the Woman Medical Officer.

In Pemba, similar lines of work were started this year by nursing sisters and later a Woman Medical Officer was posted to the island. The two Pemba Sisters and the Woman Medical Officer visit rural dispensaries and carry out very valuable work.

It is of interest that the Woman Medical Officers and Sisters are well received in the villages when they are able to spare the time to visit them, and they appear to have gained the confidence of the people. It is clear there is an enormous field opening out for African health visitors, midwives and district nurses. This demand can only be met by more and more training, as the cost of the necessary European staff would be prohibitive.

Preventive Measures.

(*a*) *Ancylostomiasis.*—The report of the Medical Officer in charge of anti-ancylostome measures is printed as an appendix. This Medical Officer is also the District Medical Officer, and the ancylostome work was only part-time employment so far as he was concerned.

In August the need of withdrawing three Sanitary (African) Inspectors for military training compelled the curtailment of anti-ancylostomiasis measures.

Up to this date, over a period of twenty-one months a total number of six thousand pit latrines have been dug and equipped with cement tops and native-type shelters. The average cost per complete latrine was about four shillings.

The areas in which the work was carried out were in the north of Zanzibar Island in the Mudirias of Mangapwani, Mkokotoni and Chaani. Those areas were selected on account of their high incidence of ancylostome infestation. The completed latrines have so far proved successful, that is they have not filled up but act as septic tanks, and they are being used by the inhabitants.

If funds were available—about £13,000—both islands could have every hut provided with pit latrine within a period of six years. That is possible even without addition to the European personnel of the department.

(*b*) *Bilharzia.*—Dr. Mozley of the London School of Tropical Medicine and Hygiene published a report of his investigations in East Africa and Zanzibar. He recommended, in brief, the draining of swamps in Zanzibar where the small host of the parasite is able to live. This has been done in the case of one large swamp at Muyuni—at a cost of over £100—as it was necessary to dig new wells for the people to replace the swamp water formerly used. The result has been very successful. The snails died and there have been few new cases of bilharzia in the area for six months. As opportunity offers and funds are available the work will be extended.

(*c*) *Malaria.*—The excellent anti-malarial work begun in Pemba by Dr. Blackaby in 1938 was continued by Dr. Freeth during the year. In Wete station conditions have improved greatly as a result of the digging of deep contour drains and the building of a cement drain in the centre of the worst swamp. In Chake Chake conditions remained much the same—it is a difficult place to deal with unless large sums of money are available. An attempt was made to flood a large swamp, which produces most of the anophelines in the town, with sea water. Owing to excessive rain the experiment failed, but will be repeated during the next dry weather in order to kill off all the vegetation in the swamp and so allow breeding in it to be controlled. In 1940 further funds have been made available for anti-malarial drainage in Zanzibar and in Chake Chake.

In Zanzibar the main rains were irregular and heavy, which resulted in an over-expenditure of anti-malarial oil. This was reflected later in the year by increased culicine breeding in sullage pits which could not be oiled. Nevertheless, Zanzibar is still less infested with all types of mosquitoes than any other East Coast town. One important contributing fact was that routine inspections of 7,500 trees brought to light 8,000 holes in which mosquitoes could breed, and in 3.4 per cent of them larvae were found. The incidence of malaria in the town was slight—most of the town being free of infection.

School Medical Service.—A very brief account of what has been done is in the body of the annual report. Generally, routine medical and dental treatment has been given to all school children and is appreciated. The general cleanliness of schools and the pupils has improved, and so has their general health. All still suffer from nutritional defects. To combat this the children in certain schools were fed over a three-monthly period, and they increased in weight, height and health. This merely proves again that they need more and better food. It is not possible financially for Government to pay for feeding adequately all school children, but the Director of Education intends—in default of anything better—in 1940 to give all children a small meal of beans and sugar every day. This policy is, of course, only one of treating the symptoms of the disease. The cure lies in increased locally grown food supplies and increased stocks of cattle, sheep and goats. One result of the war is that plans for the rapid increase of all crop production are in hand and are being acted upon. This may reflect itself in healthier children. Plans to increase stock may result in more meat, ghee and milk being available for the poorer people.

Village Health Boards.—A very interesting experiment this year has been the formation by the Medical Officer of Health, with the help of the District Commissioner, of village health boards. The co-operative idea has been popular, and in one village (Chwaka), where it had proved impossible previously to get pit latrines put in, the people adopted the idea of providing them for themselves when it was suggested to them by their own representatives. The villages with boards are much cleaner, have a refuse disposal system going and are trying out anti-malarial methods. The system will be extended gradually, and it may be that this will prove to be the best, and cheapest, method of extending public health services in rural areas.

Leave Conditions.—As a consequence of the war, a minimum three-year and maximum four-year tour has been introduced for Europeans in Zanzibar where the minimum in the past has been twenty to twenty-four months. Special local leave concessions have been devised to ameliorate these conditions of service, and it remains to be seen if they are practicable.

Several minor happenings deserve mention:

At one dispensary Mkokotoni, which is visited regularly by the Woman Medical Officer, a trained hospital ayah was posted to deal with the women and children attracted to the dispensary by the Woman Medical Officer. This is the first time a woman has been posted to a dispensary, and the occurrence is of importance since it is unusual in a Mohammedan country for a woman to be employed in this way. The innovation was such a success that in-patient accommodation for women was built and has been used. Ayahs will be posted to other dispensaries in 1940.

A locally trained African girl was so advanced that on the resignation of an Asiatic Staff nurse she was promoted to that post. In her new capacity she has visited rural dispensaries and demonstrated that she is able to deal with minor ailments and to give valuable advice. An endeavour will be made to develop this embryonic health visiting.

All dispensers during the year were required to establish sub-centres at any centres of population near their dispensaries. This expansion of their activities was appreciated. Dispensers were also instructed in elementary public health work and put their knowledge into practice in the villages.

The in-patient accommodation for women at Chake Chake Hospital was doubled during the year and that in the Zanzibar Hospital was improved.

LEGISLATION AFFECTING PUBLIC HEALTH ENACTED DURING THE YEAR.

Government Notice No. 6	The Public Health (Recognized Family Vaults) Order, 1939.
Government Notice No. 15	The Public Health (Appointment of Cemeteries) Order, 1939.
Government Notice No. 38	The Provincial Administration (Construction of Pit Latrines) Order, 1939.
Decree No. 4	The Public Health (Infectious Diseases Carriers) (Amendment) Decree, 1939.

FINANCIAL.

Table of Actual Expenditure.

	£ 1936	£ 1937	£ 1938	£ 1939
Medical Department ...	38,098	40,427	40,158	40,577
Municipal Votes controlled by Medical Department	7,144	7,557	7,385	7,633
Grants-in-aid ...	230	230		—
Total ...	45,472	48,204	47,543	48,210
Total Revenue of the Protectorate ...	475,444	494,828	465,381	499,396
Percentage of Total to Total Revenue ...	9.56	9 74	10.36	9.65
Total Revenue of the Department ...	3,696	3,805	4,492	4,400

SECTION II.

PUBLIC HEALTH.

(A) GENERAL REMARKS.

Returns for the Year.—Detailed figures appear in Table A, Section VI at the end of the report. A comparison between those for 1939 and past years follows :—

		1935	1936	1937	1938	1939
New cases	...	130,115	128,235	125,542	121,361	113,739
In-patients	...	3,853	4,413	4,673	5,099	4,788
Total Attendances	...	444,175	459,170	448,379	406,639	437,876
Surgical Operations (major)	...	1,151	1,016	954	1,218	664
Surgical Operations (minor)	...	2,683	2,295	3,220	3,143	2,489

The relative proportions of the two sexes attending at all units for treatment are shown in the following table :—

		1935	1936	1937	1938	1939
		%	%	%	%	%
Males	...	73.9	71.4	72.8	73.0	77.0
Females	...	26.1	28.6	27.2	27.0	23.0

The principal causes of deaths in Government Hospitals during the last five years were :—

		1935	1936	1937	1938	1939
Total deaths	...	418	470	476	531	426
Senility	...	75	135	136	104	124
Pulmonary tuberculosis	...	50	49	45	56	44
Pneumonia	...	20	29	42	80	40
Ancylostomiasis	...	17	13	10	17	25
Diseases of the Heart, Veins and Arteries		11	11	11	16	23

I. GENERAL DISEASES.

The diseases treated at the Government Hospitals and dispensaries during the last five years are grouped in percentages of cases treated in the following table :—

		1935	1936	1937	1938	1939
		%	%	%	%	%
Endemic, Epidemic and Infectious diseases		12	13	14	15	18
Nervous system	...	6	6	6	6	5
Respiratory system	...	8	7	8	8	7
Digestive system	...	30	26	26	26	24
Skin and cellular tissues	...	27	28	26	26	32
External causes	...	8	8	8	8	8
Others	...	9	12	12	11	6
		100	100	100	100	100

The Epidemic, Endemic and Infectious diseases group varies little from year to year in its relation to the total number of cases of all diseases treated. The largest numbers dealt with in this group were malaria, yaws and gonorrhœa.

The number of cases and deaths due to Epidemic, Endemic and Infectious diseases are shown in the following table :—

	Total numbers.	Epidemic, Endemic and Infectious Diseases.	Deaths.
1935	130,115	15,394	83
1936	128,235	16,638	99
1937	125,542	17,477	80
1938	121,361	18,507	89
1939	113,379	19,833	109

II. COMMUNICABLE DISEASES.

(*a*) Mosquito or Insect-Borne.

There is nothing new to report, and the incidence of these diseases remains at normal level.

(*b*) Infectious Diseases.

During the year there were less infectious diseases of all sorts than usual. There were two small and quickly controlled outbreaks of typhoid which received undue publicity. The carriers in each case were detected and one was treated and cured and the second, an intractable case, was repatriated to his native village. As a war precaution free inoculation against typhoid was provided, and all Europeans and others likely to travel abroad were invited to get themselves immunized. The response was fair, thirty-four Europeans and eighty-four Asiatics were inoculated.

There was no small-pox in the islands during the year, but two "suspected" ships came into harbour and were dealt with in the usual way—a number of contacts who did not report regularly were prosecuted.

(*c*) Helminthic Diseases.

A full account of the year's anti-ancylostome measures is printed in Appendix III.

(B) VITAL STATISTICS.

I. POPULATION.

There were 5,095 registered births and 3,907 registered deaths. The figures are so obviously inaccurate that it is useless working out rates.

There were 15,843 immigrants and 13,983 emigrants.

II. EUROPEAN OFFICIALS.

The officials included in Table A and B below are those whose names appear in the Protectorate Staff list only. Wives and families are not included.

Table A.

Showing the sick, invaliding and death rates of European officials during the last three years:—

	1937	1938	1939
Total number of officials resident ...	110	103	107
Average number resident ...	69.60	79.73	77.58
Total number on sick list ...	159	166	185
Total number of days on sick list ...	709	684	535
Average daily number on sick list ...	1.94	1.87	1.47
Percentage daily of sick to average number resident ...	2.61	2.34	1.89
Average number of days on sick list for each patient ...	4.46	4.12	2.89
Average sick time to each resident ...	6.44	6.64	5
Total number invalided ...	—	—	—
Percentage of invalided to total residents ...	—	—	—
Total deaths ...	1	—	—
Percentage of deaths to total residents ..	0.9	—	—
Percentage of deaths to average number residents ...	1.44	—	—

The most common diseases were:—

Local injuries	16
Diseases of the digestive system	18
Influenza	20
Malaria	11

One Medical Board was held on a European official during the year for the following cause:—

Progressive muscular atrophy	1

Deaths.—No death occurred during the year.

III. EUROPEAN NON-OFFICIALS.

Two hundred and thirty-six European non-officials reported at Government hospitals as compared with one hundred and sixty-six for the previous year.

The principal causes of sickness were :—

Diseases of the digestive system	21
Diseases of the skin	67
Local injuries	21
Malaria	13

Deaths.—One European non-official died during the year.

Chronic Nephritis	1

IV. NON-EUROPEAN OFFICIALS.

Table B.

The following table shows the sick, invaliding and death rates of non-European officials during the past three years :—

		1937	1938	1939
Total number of officials resident	...	462	513	446
Average number resident	...	423.48	466.58	408.21
Total number on sick list	...	264	332	320
Total number of days on sick list	...	1,753	2,204	1,754
Average daily number on sick list	...	4.80	6.04	4.80
Percentage daily of sick to average number resident	...	1.13	1.29	1.17
Average number of days on sick list for each patient	...	6.64	6.64	5.48
Average sick time to each resident	...	3.79	4.29	3.93
Total number invalided	..	5	4	1
Percentage of invalided to total residents	...	1.07	0.78	0.22
Total deaths	...	—	4	1
Percentage of deaths to total residents	...	—	0.78	0.22
Percentage of deaths to average number residents	...	—	0.08	0.24

The most common diseases were :—

Influenza	94
Malaria	62
Diseases of the respiratory system	50
Diseases of the digestive system	21

Medical Boards were held on four Asiatic officials of whom one was permanently invalided for the following cause :—

Hyperpyesis	1

Deaths.—One death occurred during the year.

Blackwater fever	1

SECTION III.

HYGIENE AND SANITATION.

A. GENERAL REVIEW OF WORK DONE AND PROGRESS MADE.

I. PREVENTIVE MEASURES.

(*a*) Mosquito and Insect-Borne Diseases.

Malaria.—The report of the Malaria Survey of the Protectorate—completed in 1937—has not yet been printed.

In Zanzibar Town routine anti-malarial measures continued, and these consisted of a weekly inspection of all premises and property in the township and half a mile outside it, cutting of grass and collection of shells, coconuts husks, etc., drainage or filling of depressions, filling of holes in trees, oiling or paris greening large accumulations of water during the rains, oiling of sullage pits, etc. A few hundred feet of permanent anti-malarial drainage was laid, but some very expensive drainage is still required, for which funds are not available.

Six control stations (huts and houses) were kept under observation as in past years and catches were :—

	Anopheline.	Culicine.	Stegomyia.	Rainfall in inches.
1936	20	1,684	175	76.45
1937	12	1,361	170	62.47
1938	4	1,419	120	73.80
1939	58	2,355	89	72.60

This continues to prove that anopheline and stegomyia mosquito breeding can be controlled—even under adverse weather conditions—but that the culicines breeding in many of the 10,000 cesspits are largely uncontrollable.

It is fortunate that the low-lying land permits tidal water to enter most of these pits and stops breeding. Till the town is sewered the culicine mosquito will remain in Zanzibar. In 7,500 trees 8,000 potential breeding places were discovered and in 3.5 per cent of these holes larvae, mostly stegomyia, were found. Larvae were also found in bananas and pine-apples, but mango trees and flamboyants were the worst.

There were less cases of malaria of all varieties seen in the town than usual —despite heavy and irregular rains. Only six European officials contracted the disease out of about seventy-five average residents. Of these four were infected in the country districts, one was infected on the mainland and was presumed to have had a relapse.

During the year the following places were found in which there were larvae :—

In the township.

Culicine.	Stegomyia	Anopheline
638	5,196	186

In the half mile controlled strip outside the town boundary.

Culicine.	Stegomyia	Anopheline
678	347	505

In Pemba anti-malarial works in Wete have diminished the mosquito population to a minimum. This is due to deep contour drains at the bases of all hills and the canalization of swamps; in some swamps as much as 3,000 gallons of water a day was collected by a single contour drain. Very considerable

difficulties were met with, and overcome, in the Wete slaughter house swamp. Here many springs were discovered to be the cause of the perpetual sogginess of the area. The smaller ones were dealt with by sub-soil drains and the water from the larger ones, on discharging 12,000 gallons a day, was led to the sea by stone-lined canals. Contour drains diminished the flow from all springs and dried up many of the small ones. The culicine population remained much the same on account of the number of cess pits and sullage pits in the town. It is not practicable to oil them, and it is fortunate that all do not give rise to breeding. A good deal of levelling was carried out during the year, clearing of bush, and afforestation of swampy areas with Eucalyptus is in hand. The town of Wete from a mosquito point of view now compares very favourably with any similar mainland town. Few attacks of malaria were experienced by officials, and the spleen rate of the children of non-European officials continued to be low.

In Chake Chake an attempt was made to flood the chief anopheline producing swamp with sea water to kill off vegetation so as to allow of the control of breeding. Heavy rains coincided with the flooding and much breeding at the margins occurred so that the experiment had to be abandoned.

In Mkoani, in Pemba, an African Sanitary Inspector was posted for a short period. With the Arab Sub-Assistant Surgeon posted to the hospital he engaged in anti-malarial work and produced good results, and undoubtedly reduced the number of mosquitoes of all sorts in the township. Swamps were drained, excessive vegetation rooted out, sub-soil drains put in and routine anti-malarial measures introduced.

Tuberculosis.—Fewer cases than usual were notified, and each one was dealt with individually. In the case of Asiatics it was nearly always possible to have the patient removed to healthier surroundings, either in India or elsewhere. Arabs as a rule go home to Arabia when they contract tuberculosis. Africans can sometimes be treated at home or in the Walezo Tuberculosis Wards. The results of treating Africans is very disappointing, as few show an improvement. This is presumably largely the result of the climate.

(*b*) Epidemic Diseases.

There were no outbreaks of any serious epidemic during the year, apart from one of five cases of typhoid and one of two cases. In general, the incidence of epidemic diseases was much below average. A few cases of bacillary dysentery occurred amongst clove pickers in Pemba, but they were all sporadic. In addition to vaccinations of passengers on ships, 5,186 persons were vaccinated in Zanzibar Town and 1,228 persons in Pemba.

(*c*) Helminthic Diseases.

Appendix I gives details of what has been done in regards to ancylostomiasis. Funds are available in 1940 to continue the work only at a reduced rate. What can be done to extend the digging of pit latrines by enlisting the help of village boards will be done, but the hard facts remain that if petrol is short Medical Officer and Sanitary Inspector staff is reduced on account of the war, money is reduced, the amount of work which can be carried out will be small. All that can be done is to keep the machine going.

In the preliminary general review of this report mention has been made of what has been attempted in regard to schistosomiasis. That is, one village pond, heavily infested with cercariæ, has been drained, and wells dug to provide the people with water. The cost was heavy (£100), and it is not expected that much can be done till conditions are normal to implement the recommendations of Dr. Mozley (the London School of Tropical Medicine Scholar) who worked in Zanzibar for a year. An attempt is being made to get out estimates of the cost of the various proposals, and it is just possible one or two of the minor recommendations can be put in hand. But it is fairly certain that large scale anti-bilharzia measures cannot be started just yet.

II. GENERAL MEASURES OF SANITATION.

(*a*) Sewage Disposal.

Zanzibar Town.—Fifty-five new septic tanks were installed during the year and one hundred and twenty yards of drainage (small sewers to take effluent) were laid. This resulted in the abolition of ninety sullage or cess pits.

In the native area of the town no attempt has been made to instal any drainage, and cess pits and sullage pits exist in undiminished numbers. Public latrines are badly needly in the "native areas", but in default of drainage and water they cannot be provided. One public latrine was built which brings up the number erected in the last five years from two to twenty-one. Two sets of twelve cement basins, with water laid on, for the public to wash their clothes were built in Zanzibar town. They proved very popular, and the practice of washing clothes in public drains and mosques has decreased. More will be built in 1940.

Pemba Townships.—In Wete flush closets were installed in government buildings and bucket latrines abandoned. In Chake Chake two public latrines (with septic tanks) were built, and a similar latrine was erected in the police lines.

Rural Areas.—Appendix III deals with ancylostomiasis prevention and, incidentally, with the only sewage disposal methods employed in rural area.

(*b*) Scavenging and Refuse Disposal.

The services were carried out efficiently during the year by the Medical Officer of Health in Zanzibar and by Medical Officers in Pemba. The District Medical Officer, Pemba, much increased the efficiency of the services during the year.

(*c*) Drainage.

As noted above 3,000 yards of new closed drains were laid in Zanzibar town and 300 yards of open drains. In Pemba approximately 743 feet of contour drains were put in at Wete, 762 feet large open drains and 375 feet of small open anti-malarial drains. In Chake Chake 250 yards of new drainage were laid.

(*d*) Water Supplies.

Remained excellent throughout the year in Zanzibar town. In Pemba townships they are satisfactory, after chlorination. At Mkoani a water supply has been installed to replace shallow and polluted wells, rain water tanks, etc. It is a good and plentiful supply and fills a long-felt want. In a number of rural areas improvements were effected in wells and dams.

(*e*) Offensive Trades.

No difficulties—other than of a minor routine nature were encountered during the year.

(*f*) Clearing of Bush and Undergrowth.

This continued under the supervision of the Medical Officer of Health, Zanzibar, and Medical Officers in Pemba. The work was carried out efficiently and economically.

(*g*) Sanitary Inspectors.

In the report for 1938 a detailed account of the duties of Sanitary Inspectors was given. The staff now consists of twelve Sanitary Inspectors and eight learners. (Zanzibar town has about 45,000 inhabitants.) Seven Sanitary Inspectors and five learners are in charge of the six sanitary districts of Zanzibar town. One Sanitary Inspector attends to Port Health and Anti-malarial work of the town.

One Sanitary Inspector is employed partly in the town and partly on rural work. One learner is on special duties, including inspection of dairies, Zanzibar district.

In Pemba two Sanitary Inspectors are stationed.

One African Sanitary Inspector and two African learner Sanitary Inspectors are at the War.

In addition to their normal duties, all Sanitary Inspectors and learners were trained in first-aid this year. They then taught all their headman and other details, and the result has been that four hundred and fifty trained men are available in Zanzibar town for emergencies. They are organized in their sanitary districts as units, and continue weekly training and drill. The three African Sanitary Inspectors are acting as Sergeant-Major and Sergeants in the Zanzibar Field Ambulance Company. They have proved themselves very able and efficient soldiers, who are well able to handle and control their men.

III. SCHOOL HYGIENE.

Zanzibar and Pemba Schools.

Not all of the rural school children in Zanzibar district were medically examined in 1939, as the available medical staff were too busy on emergency work; when that rush was over the school children had gone on their annual long holiday. The town children were examined, as were all the children in Pemba and the girls in the Government Girls' School, Chwaka School and Chake Chake Girls' School.

A comparison of the percentage tables of non-medical conditions which were observed show that so much depends on the judgment of the examining Medical Officer that as comparative tables most of the figures are useless. For example, at one girl's school in 1937 nutrition was recorded as 47 per cent good, 48 per cent fair and 5 per cent poor, in 1938 the same school gave 40 per cent good, 56 per cent fair and 4 per cent poor and in 1939 the same school showed 75 per cent good, 19 per cent fair and 4 per cent poor. The conditions have remained much the same, as have the girls, but the examining Medical Officer's standards differed greatly. Only when actual defects encountered are comparative tables of value; accordingly, only general comments follow.

Cleanliness.—In all schools the standards were higher. At the Rural Middle School and in the Government Girls' School this was particularly evident. The pupils of several of the rural schools left a lot to be desired, but there was definite evidence in all that efforts were being made to achieve cleanliness. In some schools clean *kanzus* were issued periodically, whilst the pupils washed their own clothes. If it were possible the system might be extended with advantage to all country schools. Scabies and lice were not so common as in the past.

Nutrition.—As in the past, the Pemba school children appeared less undernourished than in Zanzibar where, as usual, over 50 per cent showed gross signs of avitaminosis, except in the Government Central School. In four rural schools in Zanzibar amongst 228 boys the figure was 65 per cent.

Three schools, Chwaka, Mwera and Kombeni, whose pupils have received a daily quantity of milk, were visited recently and the weight, chest measurement and general fitness of each pupil recorded. Uzini School, receiving no milk ration was inspected as a "control".

Average increase in weight, chest measurement and general condition was as follows:—

Schools Receiving Milk.—The pupils averaged an increase of two pounds in weight and one and a half inches in the chest.

Control School.—One and one fourteenth of a pound increase and one inch increase in the chest.

In the three schools there was a decrease in the signs of avitaminosis. Xerophthalmia, interstitial keratitis and conjunctivitis were rarely found, there was less puckering or furrowing of the lips, and skin lesions were slightly decreased but not markedly so. In isolated cases, the body weight of certain pupils had actually decreased, but upon enquiry it was discovered that the child had been absent from school and thus foregone his milk ration.

An interval of six months elapsed between the recording of weights and general examination on each occasion, and the health of the pupils have undoubtedly benefited from their consumption of milk.

The schoolmasters all agreed that the children were more easily taught and displayed more interest in their work than before they were given milk. The conclusion is obvious—all school children should be fed adequately if they are to derive the maximum benefit from the education provided for them; the poverty of the country makes this impossible. But the Director of Education will provide a cheap meal of locally produced fruit and beans for all school children in 1940. This is the best that can be done as a protein diet rich in vitamin is out of the question financially. But small as is the advance it is of great importance, and as finances improve it is to be expected the feeding of school children will improve.

Vaccination.—Some 70 per cent were successfully vaccinated and 8 per cent were unsuccessful. An attempt will be made in 1940 to vaccinate children who do not attend Government Schools and also to examine them medically.

Teeth.—The dental surgeon visited all schools and examined and treated all the children. As in the past, about 35 per cent required treatment.

Nose and Throat.—No variation was found from the usual figure of around 20 per cent who possessed large tonsils, adenoids or dirty mouths.

Diseases of the Eyes.—Angular conjunctivitis and follicular conjunctivitis were the most common, although only 5 per cent of the children showed any signs of disease. Trachoma was only found amongst Arab adolescents.

Diseases of the Ears.—Four per cent, as in the past, showed signs of otitis media or had large plugs of wax in their ears.

Heart.—Almost all of the usual two per cent disabilities were attributable to hæmic murmurs due to secondary anæmias.

Spleen Enlargement.—This varied from 30 per cent in the town to 75 per cent in schools situated in swampy areas. Blood parasitis were seen, as usual, in 20 per cent of all the younger pupils. In Pemba the percentage was 40 to 50 per cent.

Kahn Test.—Was not done, as it is so unpopular. The figure for hereditary syphilis was reckoned as between 10 and 15 per cent.

Helminth Infection.—Ancylostomiasis was general, and between 30 to 40 per cent of all children harboured the worms, but only 20 per cent showed any marked degree of anæmia. Ascaris occurred in about 30 per cent of the children. Trichuris and strongyloides were also seen. There was no difference in the incidence between boys and girls, except that in the Government girls' school the rates—on account of regular treatment—were much lower than elsewhere.

Urinary Schistosomiasis.—As in the former years, about 30 per cent were infected in Pemba, and only in two schools were any seen in Zanzibar. At the worst one (Muyuni) the infection rate is rapidly declining from 32 per cent last year to 20 per cent this year, on account of the drainage of a heavily infested pond in which the children used to bathe.

IV. HOUSING AND TOWN PLANNING.

A. URBAN HOUSING.

(*a*) *Zanzibar Stone Town.*—A new set of up-to-date building rules was introduced during the year. This publication coincided with the outbreak of War, and it has not been possible to insist on the enforcement of the provisions, as very little building is being done. There were six applications to build and six hundred and twenty-four applications to repair or alter houses. A total of four hundred and eighteen houses were improved to a greater or less degree in regard to lighting, ventilation, drainage, etc.

One hundred houses were connected up to public drains, which allowed ninety cess pits and sullage pits to be abolished.

Eleven lodging houses were improved and, in general, property owners were rather more helpful than in the past and co-operated fairly well.

(*b*) *Zanzibar Native Town.*—A new set of rules was published and applied to the "Native Area" of Zanzibar Town. The size of building plots were specified and a number of other minimum standards are laid down.

Two hundred and twenty applications to build new huts and 1,388 to repair huts were dealt with.

(*c*) *Pemba Townships.*—A total of seventy new huts were built in Wete, thirty-six in Chake Chake and eight in Mkoani.

Applications to repair or alter huts numbered 139 in Wete, 67 in Chake Chake and 41 in Mkoani. Very little permanent type building was done during the year, and only three new stone houses were built in Pemba and 38 applications submitted to alter or repair stone houses.

B. RURAL HOUSING.

There is nothing to comment on that has not been mentioned in past years, except to say that there is a slight tendency to provide huts with latrines—even in areas where Sanitary Inspectors have not been posted. This tendency is very slight, but undoubtedly exists. Rural housing, as housing, is suited to the needs of the country and the type of building used provides few places for rat-breeding and, indeed, rats are rare in Zanzibar.

V. FOOD IN RELATION TO HEALTH AND DISEASES.

School Children.—In Section III the results are set out of giving certain children free milk and encouraging them to have a meal in school hours. The fact is accepted by Government that a large proportion of school children are qualitatively under-nourished and that they should be fed at school. Lack of money so far has prevented this being done, but the Director of Education intends to provide a meal a day for school children in 1940. It will be of necessity deficient in proteins and vitamins because of the expense.

Increased Food.—In anticipation of war, every encouragement has been given to the people to grow increased crops, and they have responded, so that now more rice, potatoes, maize, etc., is available at a low price than has been the case for years. Government is proceeding with a scheme to develop the cattle industry by means of a Colonial Development Fund grant. This is probably the most important Government undertaking this year. If it succeeds, and meat, ghee and milk become cheap, the general level of nutrition should improve.

Wholesomeness of Food.

Food examined and destroyed during 1939 (in lbs.) was as follows:—Vegetables, 11,465; fruit, 32,458; onions, 11,025; garlic, 1,620; dates, 1,340; flour, 200; bread, 6; coffee, 3; fish (wet), 180; fish (dry), 1,580; beef, 20; milk (condensed), 1,281 tins; margarine (tinned), 4 lbs.

The following figures of food condemnation are given in the year 1939 by the Veterinary Officer under the Department of Agriculture:—

ZANZIBAR.

	Oxen	Cows	Calves	Goats	Sheep
Carcasses wholly condemned at Slaughter house ...	4	—	—	2	—
Carcasses partially condemned at Slaughter house ...	1,333	—	—	4,210	1,061

B. MEASURES TAKEN TO SPREAD THE KNOWLEDGE OF HYGIENE AND SANITATION.

In Schools.—Rural Sanitary Inspectors lectured and demonstrated in school in their areas. Hygiene is taught in all Government schools. The Curator of the Museum lectured and demonstrated on Hygiene to the pupils of the Girls' School.

By Propaganda.—As in 1938, African Rural Sanitary Inspectors did all that was possible in their districts to educate the people as regards hookworm, malaria, destruction and prevention of flies. Village health boards were formed and are having a very marked effect on the life of the people of the villages. They will be extended, both in the centre and the south of Zanzibar island, and later to Pemba.

C. TRAINING OF PERSONNEL.

Training of Sanitary Personnel.—Of the ten learner Sanitary Inspectors who started this year, two Africans reverted to Rural Dispensers as they had insufficient education. One African was discharged for laziness and two enlisted in the local Field Ambulance Company and attained the rank of sergeant. The five remaining [illegible]oped, will enter for the Royal Sanitary Institute Examination in 1940. This delay is because their training was interrupted on account of war emergencies, and because several of them had to be put on full duty as Sanitary Inspector on account of staff shortage.

Hospital Probationers.—At the end of the year provision existed for twenty-two male and twenty-five female probationers. This is a very considerable rise in numbers over the eight in training in 1938, and is due to the policy of training educated boys and girls having, at last, been finally implemented. It is true that no special buildings or equipment are available to train these probationers, but the new Matron (an ex-sister tutor from Uganda) has been able to overcome all the difficulties that presented themselves, and is proceeding rapidly with systematic training.

The probationers represent every local nationality—Arab, African and Indian. The absence of many of the old type of hospital orderly on military service has allowed of the engagement of greater numbers of probationers than would have been the case normally.

In the two larger Pemba hospitals training is proceeding on the same lines as in Zanzibar, and is carried out by the Medical Officers and the Sisters. The syllabus is the same as Zanzibar and the students are visited, when possible, by the Matron, as the responsibility for producing trained nurses and male nursing orderlies, rests with the Matron once the syllabus and general methods have been approved. In December ten probationers from Zanzibar and seven from Pemba were examined on their first complete year's training by a Matron sent over from Tanganyika Territory. All the Zanzibar candidates passed their examination in ward work, physiology, anatomy and bandaging. The examiner considered the standard was high and all the probationers were intelligent and keen. It was noted that the girls attained a higher standard than the boys.

Anticipating the conversion of an adjacent building to a small maternity home where the midwives can be trained, the Specialist Officer and the Matron have engaged a few girls for preliminary training as midwives next year. These girls are learning the elements of nursing and surgical cleanliness, etc., and will

form the nucleus of the staff of the maternity home. Both town and co
are employed, and it is intended that the former will work as privat
in the native areas of Zanzibar; it may prove necessary, later, to g
small Government subsidy. Country girls will practise in the larg
villages. It will take time to achieve this, as the country people ar
conservative, and most of the women are illiterate. But there is no
the service is necessary, and it is surprising how rapidly advances ca
once a scheme of this sort is started, if it proves popular.

In Pemba the intention is to start a small maternity home in
disused house near the hospital. It will be a very small unit, but it
of the training of six girls and is, at least, a start, and if local financ
it may be possible to proceed on a larger scale at a later date.

General.—Most of the rural dispensers were recalled, in rotati
fresher courses of training. Within their very circumscribed limits m
are reasonably efficient now, and, as the islands of the Protectorate a
and communications so good, they are adequate for what they have
to treat minor ills and to be able to recognize when a patient is ill en
removed to hospital for treatment, or to be seen by a doctor. The
cruited when it was difficult to obtain men of a good type for dispen
and they will never be as satisfactory as properly trained men; th
degrees be replaced by younger trained men, who will alternate h
dispensary duties, so that they are not permitted to forget what
learnt by being stationed for years in remote country districts.

As in past years, miscellaneous details, sweepers, mosquito searc
drivers, headmen and others have attended night classes in English.
the line of promotion if they can educate themselves to take it, a
several sweepers have progressed to be Sanitary Supervisors, proba
headmen. The opportunity to rise from the ranks is appreciated.

SECTION IV.

PORT HEALTH WORK AND ADMINISTRATION.

During the year 525 ships and 2,727 dhows arrived in Zanzibar as compared with 622 ships and 2,656 dhows in 1938.

Two hundred and ninety-five aeroplanes arrived, and 295 left. These aeroplanes carried 227 immigrants and 219 emigrants.

The "automatic pratique" system described in previous reports, continued to function very satisfactorily with a minimum of inconvenience to ships. The issue of bills of health was discontinued during the year, except to ships which required them especially, and none were asked for in accordance with international agreements.

Three ships were claytonized and no certificates of freedom from rodents were were issued.

Two "suspected" ships arrived and both landed their suspected cases at Mombasa. Routine measures were taken, and in fact neither case proved to be smallpox.

One French ship reported that plague had occurred on board, but cables sent to Madagascar found that the suspect was negative and no steps were taken to quarantine the ship.

Two thousand eight hundred and thirty-four persons embarking on ships were vaccinated, and 3,452 persons disembarking were vaccinated before landing.

Quarantine Island.—This was maintained as usual. A good many repairs were carried out during the year as the older buildings seem to deteriorate rapidly and their upkeep is expensive. The buildings are now in good repair and 1,500 people could be quarantined.

SECTION V.

WOMEN'S CLINICS AND MATERNITY AND CHILD WELFARE.

A. Zanzibar.

The new cases seen at the women out-patient department have been :—

		1937	1938	1939
New cases	...	7,310	5,245	4,502
Total attendances	...	43,306	38,038	39,104

The incidence of diseases in order of frequency was malaria, ancylostomiasis, respiratory infections, skin infections and venereal diseases.

One hundred and foty-two minor operations were performed at the women's clinic.

Special Clinics.—Ante-Natal.—This work has steadily increased and there were 148 new cases as compared with 109 in 1938, and 1,147 repetitions compared with 784 in 1938. There were 47 deliveries in hospital drawn from the ante-natal clinic; only one death occurred in the series, a woman suffering from puerperal sepsis who had been delivered by a "handy woman" in the country.

Infant Welfare.—Attendances have increased and, what is very satisfactory, children are brought regularly for examination.

Genito Urinary and V. D. Clinic.—Attendance is much more regular, women suffering from syphilis and gonorrhœa being now willing to attend till cured.

Other Clinics.—Ancylostomiasis, attendance increased.

Diabetes, attendances are irregular, but the existence of the clinic means the survival of some women who would have died otherwise.

B. Zanzibar Rural Dispensary Work.

(i) *Mkokotoni.*—The numbers attending this clinic have so increased during the past year that it became necessary to convert an old prison into a dispensary and out-patient department. This has greatly facilitated the work and added to the comfort of the patients.

Recently, to cope with increasing numbers, an ayah who was trained in the hospital has been transferred to Mkokotoni. As more trained staff are made available there is little doubt that an ayah or nurse at each dispensary where women clinics are held would not only facilitate the work at the actual clinics but would also attract patients.

The diseases treated in greatest frequency, as in past years were yaws, ancylostomiasis and malaria.

(ii) *Selem.*—Attendances here are steadily on the increase and, as in the past, ancylostomiasis is the disease occurring most frequently. A separate small ward for women would be an advantage.

(iii) *Mwera.*—Here again there has been an increase in the attendance. The commonest disease is ancylostomiasis.

(iv) *Bweleo.*—A clinic was opened in January. So far the attendance is satisfactory.

(v) *Ziwani Police Lines.*—This clinic was reopened in November, 1938. Attendances were never at any time satisfactory, and so the clinic was closed in April this year.

One of the most important features of the rural work is the posting of an ayah to a dispensary. This is an entirely new departure and, as it appears to have been successful, others will be posted as opportunity arises. The intention is to post to rural units only the older type of hospital ayah who is a most useful person, though not literate as a rule. The places of these women will be taken by Standard VI probationers in the hospital.

C. Pemba Hospitals.

Women's clinics on much the same lines as in Zanzibar were started in Pemba by the nursing sisters in Wete and in Chake Chake. They dealt with all minor illnesses and referred any serious cases to the Medical Officer. The difficulty with regard to women refusing to be examined by a male doctor is not so obvious in Pemba as it is in Zanzibar, and the Sister-Medical Officer combination, worked well and the number of female attendance increased as under :—

	1938	1939
Number of new cases of women and children seen at Wete and Chake Chake...	5,226	5,705
Number of repetitions of women and children seen at Wete and Chake Chake ...	11,914	13,282

Later in the year it became possible to post a Woman Medical Officer to Pemba at Chake Chake. Here she took charge of the women out-patient department and women's wards; she visited Wete weekly and Mkoani at intervals. She also visited regularly certain rural dispensaries.

The women's wards at both stations were enlarged during the year.

SECTION VI.

HOSPITALS AND DISPENSARIES.

In the following tables A and B details of the work carried out at the various Government hospitals and dispensaries are tabulated :—

Table A.

Medical Units, Beds and Patients by Districts.

		Zanzibar Island.		Pemba Island.		
Medical Units.		Town.	District.	Town.	District.	Total
European Hospital	...	1	—	—	—	1
Asiatic and African Hospital	...	1	2	3	—	6
Police Lines	...	1	—	—	—	1
Prison Infirmary	...	1	—	—	—	1
Infectious Disease Hospital	...	1	—	—	—	1
Walezo Poor House	...	—	1	—	—	1
Makondeni Leper Colony	...	—	—	—	1	1
Sub-Dispensaries	...	1	13	—	7	21
Mental Hospital	...	1	—	—	—	1
Eye Clinic	...	1	—	—	—	1
School Clinic	...	1	—	—	—	1
Walezo Leper Colony	...	—	1	—	—	1
In-Patients.						
Beds available :						
European	...	14	—	—	—	14
Asiatic and African in Hospital	...	118	14	105	—	237
African in Institutions	...	81	192	—	—	273
Total	...	213	206	105	—	524
Cases admitted :						
European	...	86	—	—	—	86
Asiatic and African in Hospital	...	2,375	500	1,638	—	4,513
African in Sub-Dispensaries	...	—	189	—	—	189
Total	...	2,461	689	1,638	—	4,788
Out-Patient Attendances.						
Hospitals	...	130,362	52,412	92,723	—	275,497
Sub-Dispensaries	...	45,414	57,873	—	59,092	162,379
Total	...	175,776	110,285	92,723	59,092	437,876
New Cases.						
European	...	421	—	—	—	421
Asiatic and African in Hospital	...	31,871	12,558	29,154	—	73,583
African in Sub-Dispensaries	...	8,218	16,064	—	15,453	39,735
Total	...	40,510	28,622	29,154	15,453	113,739

Table B.

List of Sub-Dispensaries.

Zanzibar District.

Name.		New Cases.	Attendances.
School Clinic	...	2,241	3,076
Mkokotoni and Chaani	...	4,508	10,125
Selem and Mangapwani	...	4,363	14,474
Makunduchi	...	2,955	8,497
Mwera	...	2,922	6,864
Kizimbani and Dole	...	2,037	7,492
Bububu	...	464	1,218
Bweleo	...	1,710	5,224
Kizimkazi	...	1,438	3,211
Chwaka and Uzini	...	1,772	3,284
Tunguu	...	1,583	4,836
Mbiji	...	1,183	1,183
Mwembeladu	...	5,977	34,120

Pemba District.

Mzambaraoni	...	1,785	5,142
Matangatwani	...	2,407	9,674
Kinazini	...	2,270	3,896
Stambuli	...	1,653	5,948
Ole	...	1,904	7,683
Kengeja	...	3,310	7,220
Kangani	...	2,124	4,076

SECTION VII.

REPORT ON THE GENERAL HEALTH OF THE PRISONERS AND SANITATION IN ZANZIBAR PRISONS.

A. PRISONS.

		Daily average in Prison.	Daily average on sick list.	Deaths.	Death rate.
Central Prison	...	120.87	5.62	1	
Wete Prison	...	22.98	1.80	1	13.9

The health of the prisoners was good and there were no epidemics. Avitaminosis is found in the majority of new admissions, but disappears rapidly with the prison diet.

As a routine all new admissions were examined for evidence of syphilis, intestinal parasites and gonorrhœa. Blood, stools and blood smears were sent to the laboratory as a routine.

One death was due to pneumonia.

Pemba Prisons.

The District Medical Officer reports that the health of the prisoners was good, and the chief causes for attendance at hospital were local injuries, constipation, ulcers, malaria and ancylostomiasis. The prison sanitation was satisfactory the whole year.

The death was due to pneumonia.

B. MENTAL HOSPITAL.

Details of admissions, discharges and deaths during 1939 were as follows:—

		Males.	Females.	Total.
Remaining on 31st December, 1938	...	36	13	49
Admitted during 1939	...	15	2	17
Died during 1939	...	5	2	7
Discharged during 1939	...	14	3	17
Remaining on 31st December, 1939	...	32	10	42

Deaths were due to:—

		Males.	Females.	Total.
Cerebral Hæmorrhage	...	1	1	2
General Debility	...	—	1	1
G.P.I.	...	1	—	1
Tuberculosis	...	1	—	1
Stomatitis	...	1	—	1
Toxæmia	...	1	—	1

The types of insanity prevailing were:—

		Males.	Females.
Mania	...	17	4
Melancholia	...	15	6
Dementia	...	8	4
Delusional insanity	...	1	—
Dementia Praecox	...	4	1
G.P.I.	...	4	—
Paranoia	...	1	—
Microcephalic Idiocy	...	1	—

Five patients were discharged cured, three were transferred to Walezo and six were discharged to the care of their relatives.

C. WALEZO INFIRMARY FOR THE POOR.

The figures for 1939 regarding the inmates of the infirmary were :—

		Males.	Females.	Total.
Remaining on 31st December, 1938	...	106	30	136
Admitted during 1939	...	370	62	433
Discharged during 1939	...	302	36	338
Died during 1939	...	77	30	107
Remaining on 31st December, 1939	...	98	26	124

D. WALEZO TUBERCULOSIS ASYLUM.

The year's figures for this institution were :—

		Males.	Females.	Total.
Remaining on 31st December, 1938	...	22	—	22
Admitted during 1939	...	52	1	53
Discharged during 1939	...	29	—	29
Died during 1939	...	26	1	27
Remaining on 31st December, 1939	...	19	—	19

E. LEPER SETTLEMENT.

I. Walezo.

The details for the year were :—

		Males.	Females.	Total.
Remaining on 31st December, 1938	...	35	19	54
Admitted during 1939	...	13	1	14
Discharged during 1939	...	7	1	8
Died during 1939	...	10	3	13
Remaining on 31st December, 1939	...	31	16	47

II. Makondeni (Pemba).

The details for the year :—

		Males.	Females.	Total.
Remaining on 31st December, 1938	...	35	27	62
Admitted during 1939	...	14	3	17
Discharged during 1939	...	—	1	1
Absconded during 1939	...	—	—	—
Died during 1939	...	3	1	4
Remaining on 31st December, 1939	...	46	28	74

Anti-malarial measures have been carried out by extension of the earth drains in the swamp to the north of the settlement, a long open central with herring-bone drain and contour drains have been dug in the swamp to the east, with considerable improvement.

Owing to the considerable expense necessitated yearly to keep the existing huts in the settlement inhabitable, it was decided gradually to replace some of these each year by the building of a more permanent type. As a preliminary, sanction was obtained to expend the sum of £80 out of the amount allocated for the upkeep of the settlement during 1939, on making bricks for the new buildings to be erected next year.

Care and Treatment of Patients.

The treatment of lepers has been that of previous years, namely, treatment of coincident diseases and injections of alepol when they ask for them.

A woman was granted parole to see her son who was ill; it was found that he was suffering from leprosy, so she brought him to the settlement for admission.

SECTION VIII.

METEOROLOGY.

All available information is printed in the Blue Book for the Protectorate.

SECTION IX.

ANNUAL REPORT OF THE DENTAL SURGEON.

As in 1938 all school children in the Protectorate were examined and treated.

It was noted that attempts were being made at all schools to make the children attend a tooth-cleaning parade.

Special work during the year was the treatment of the newly-formed Field Ambulance Company and the special Service Company of the Police.

Work Done.

	Officials and Wives.	Schools.	Native out-patient and villages.	Totals.
Fillings ...	328	436	—	764
Root-fillings ...	31	2	—	33
Extractions ...	145	216	4,793	5,154
Scale and Polish ...	56	8	—	64

SECTION X.

(A) ANNUAL REPORT OF THE PATHOLOGICAL LABORATORY, ZANZIBAR.

General Remarks.—Malaria.—The majority of infections were caused by P. falciparum. The figures are as follows, but are not regarded as accurate, as the bulk of the slides examined were thick drops only :—

P. falciparum	...	1,230
P. vivax	...	286
P. malaria	...	22
Undefined plasmodiae	...	259

PATHOLOGICAL LABORATORY RETURN FOR THE YEAR 1939.

A. PARASITOLOGY.

		Positive.	Negative.	Total.
BLOOD.—				
Malaria	...	1,797	6,184	7,981
Micro-filaria	...	26	—	26
FÆCES.—				
Ancylostoma	...	2,338		
Ascaris	...	269		
Trichuris	...	455	2,872	6,286
Strongyloides	...	338		
Others	...	14		
URINE.—				
Schistosoma hæmatobium	...	101	414	515

B. SEROLOGY.

KAHN TEST.—				
Blood	...	958	1,706	2,664
Cerebro-spinal fluid	...	1	16	17
COLOIDAL GOLD TEST.—				
Cerebro-spinal fluid	...	—	—	10
AGGLUTINATION TESTS.—				
Bact. typhosum	...	29	157	186

C. BACTERIOLOGY.

BLOOD CULTURES.—				
Typhoid	...	3	17	20
Streptococci	...	4	—	4
FÆCES.—				
Bact, typhosum	...	7	64	71
B. dysenteriæ—Flexner	...	46		
Sonne	...	4	130	180
Urine Cultures	...			59
Sputa for Mycobact. tuberculosis	...	136	363	439
Smears etc. for Gonococci	...	311	267	578
Other cultural and general examinations	...			144
VACCINES.—				
Gonococcal	1,710 c.c.			
Others	415 c.c.			
Water examinations (bacteriological)	...			79
Rats examined	...	—	900	900

D. BIOCHEMISTRY.			
Blood Sugar tolerance tests	...		4
,, Sugar single examinations	...		954
,, Urea	...		30
,, Van den Bergh's reactions	...		5
Fractional test meals	...		12
Urine (urea, sugar, albumen, etc.)	...		2,199
Cerebro-spinal fluids (chlorides, sugar, etc.)	...		9
E. GENERAL.			
Blood (cell counts, hæmoglobin, etc.)	...		163
Blood (grouping)	...		31
F. HISTOLOGY.			
Specimens sectioned	...		37
Ma ignant tumours	...		
Epithelioma (jaw)	...		1
Carcinoma (mouth)	...		1
Sarcoma (leg)	...		1
Sarcoma (testis)	...		1
Other material consisted of fibromas, lepromas, tuberculosis, ulcers, etc.			
G. AUTOPSIES.			
Death due to Asphyxia	...	4	14
,, ,, ,, Accidents	...	5	
,, ,, ,, Knife injuries	...	2	
,, ,, ,, Natural causes	...	3	
H. MEDICO-LEGAL.			
Material from 7 cases was examined and reported on	...		7
Total examinations	...		23,676

(B) SCIENTIFIC.

No scientific papers were published during 1939 by members of the Medical Staff.

RETURNS.

Table I.

SANCTIONED ESTABLISHMENT, 1939.

Administration Division.

Director of Medical Services.
9 Clerks

Special Appointments.

1 Senior Specialist Officer.
1 Dental Surgeon.

Medical Division—General.

1 Senior Medical Officer.
8 Medical Officers.
7 Sub-Assistant Surgeons.
2 Senior Native Medical Assistants.
2 Asiatic Midwives.
2 Asiatic Nurses.
4 Asiatic Dispensers.
1 Asiatic Cook.

Nursing Staff.

1 Matron.
10 Nursing Sisters.

Sanitation Division.

1 Sanitary Superintendent.
3 Asiatic Sanitary Inspectors.

Laboratory.

1 Pathologist.
1 Laboratory Assistant (Asiatic).

Table II.

FINANCIAL.

			1939
A. Expenditure—Medical Department.		£	£.
Personal Emoluments	...	24,432	
Other Charges:—			
General Stores	...	1,403	
Drugs, Dental and Surgical Requisites	...	3,161	
Maintenance of Patients	...	4,478	
Passages	...	1,427	
Sanitation Labour	...	1,445	
Grants to Lepers	...	122	
Miscellaneous Services	...	4,108	40,577
B. Expenditure—Municipality.			
Personal Emoluments	...	2,825	
Other Charges:—			
Equipments and Stores	...	339	
Sanitation Labour	...	275	7,439
C. Revenue.			
Hospital Fees, Sale of Drugs, etc.	...	1,925	
Contribution from other dependencies towards the Quarantine Services	...	2,475	4,400

Table III.

RETURN OF STATISTICS OF POPULATION.

All the information available is in the Protectorate Blue Book.

Table IV.

METEOROLOGICAL RETURN.

The following is a brief summary of the more important meteorological returns available for the year, compared with the mean for the years 1892-1936 in the case of Zanzibar and the mean for the years 1933-1937 in the case of Pemba :—

	Zanzibar (town)		Pemba (Wesha)	
	1892-1936	1939.	1933-1937	1939.
Mean of daily maxima ...	84.3	86.1	86.1	85.0
Mean of daily minima ...	76.6	73.9	72.6	71.0
Mean of daily range ...	77.7	13.2	13.5	14.0
Mean ...	80.5	80.0	79.3	78.0
Rainfall (inches) ...	61.47	72.60	77.81	73.41
Rainy days ...	104	135	149	167

Tables V and VI.

Return of Diseases and Deaths for the Year 1939.

DISEASES	Table V					Table VI
	Remaining in Hospital at end of 1938	Yearly Admissions	Total Cases Treated	Total Deaths	Remaining in Hospital at end of 1939	All Cases including both In- and Out-Patients
1. Enteric Group—						
(*a*) Typhoid fever	2	7	9	1	...	16
(*b*) Paratyphoid fever	...	...	...	...	...	...
2. Typhus fever	...	...	...	...	...	...
3. Relapsing fever	...	...	...	...	...	...
4. Undulant fever	...	1	1	...	...	2
5. Small-pox	...	...	...	...	...	...
6. Measles	...	1	1	...	...	15
7. Scarlet fever	...	...	...	...	...	...
8. Whooping cough	...	...	...	...	...	59
9. Diphtheria	...	2	2	...	...	4
10. Influenza—						
(*a*) With respiratory complications	...	5	5	...	...	32
(*b*) Without respiratory complications	...	25	25	...	...	781
11. Cholera	...	...	...	...	...	...
12. Dysentery—						
(*a*) Amœbic	...	2	2	...	...	6
(*b*) Bacillary	1	32	33	9	...	82
(*c*) Unclassified	...	33	33	2	...	71
13. Plague—						
(*a*) Bubonic	...	...	...	...	...	...
(*b*) Pneumonic	...	...	...	...	...	...
(*c*) Septicæmic	...	...	...	...	...	...
14. Acute poliomyelitis	...	...	...	...	...	1
15. Encephalitis lethargica	...	...	...	...	...	...
16. Cerebro-spinal fever	...	...	...	...	...	...
17. Rabies	...	...	...	...	...	...
18. Tetanus	...	5	5	3	...	10
19. Tuberculosis of the respiratory system	26	111	137	44	27	358
20. Other tuberculous diseases	...	5	5	...	3	14
21. Leprosy	116	15	131	13	47	168
22. Venereal diseases—						
(*a*) Syphilis	6	69	75	2	2	909
(*b*) Gonorrhœa	1	43	44	...	5	1,179
(*c*) Other venereal diseases	2	11	13	...	...	107
23. Yellow fever	...	...	...	...	...	...
24. Malaria—						
(*a*) Benign tertian	2	37	39	...	2	542
(*b*) Subtertian	1	171	172	7	1	1,806
(*c*) Quartan	...	...	...	...	...	15
(*d*) Unclassified	4	133	137	4	3	6,516
25. Blackwater fever	...	6	6	1	...	14
26. Kala-azar	...	...	...	...	...	...
27. Trypanosomiasis	...	...	...	...	...	...
28. Yaws	2	41	43	...	...	4,883
29. Other protozoal diseases	...	...	...	...	...	41
30. Ancylostomiasis	25	254	279	7	8	11,542
31. Schistosomiasis	1	20	21	1	...	352
32. Other helminthic diseases	...	...	...	...	...	181
33. Other infectious and/or parasitic diseases	1	16	17	...	1	197
34. Cancer and other tumours—						
(*a*) Malignant	5	25	30	10	...	55
(*b*) Non-malignant	1	30	31	1	2	125
(*c*) Undetermined	...	...	...	...	...	2
35. Rheumatic conditions	2	22	24	...	3	822
36. Diabetes	3	29	32	2	5	91
37. Scurvy	...	...	...	...	...	...
38. Beri-beri	...	...	...	...	...	...
39. Pellagra	...	...	...	...	...	...
40. Other diseases—						
(*a*) Nutritional	7	26	33	2	3	573
(*b*) Endocrine glands and general	...	5	5	...	...	36
41. Diseases of the blood and blood-forming organs	...	14	14	6	1	529
42. Acute and chronic poisoning	...	...	...	...	...	23
43. Cerebral hæmorrhage	1	10	11	7	...	20
44. Other diseases of the nervous system	68	77	145	5	13	1,188
45. Trachoma	...	2	2	...	...	168
46. Other diseases of the eye and annexa	1	72	73	...	6	2,644
47. Diseases of the ear and mastoid sinus	...	8	8	...	...	1,721
48. Diseases of the circulatory system—						
(*a*) Heart diseases	...	49	49	18	4	178
(*b*) Other circulatory diseases	14	138	152	7	2	676
49. Bronchitis	2	92	94	1	1	4,667
50. Pneumonia—						
(*a*) Broncho pneumonia	...	19	19	3	...	78
(*b*) Lobar-pneumonia	9	193	202	40	2	411
(*c*) Otherwise defined	...	1	1	...	...	34
51. Other diseases of the respiratory system	4	59	63	4	1	3,200
52. Diarrhœa and enteritis—						
(*a*) Under two years of age	...	6	6	...	...	112
(*b*) Over two years of age	1	52	53	10	1	800

Tables V and VI.—(*Contd.*)

	DISEASES	Table V					Table VI
		Remaining in Hospital at end of 1938	Yearly Admissions	Total Cases Treated	Total Deaths	Remaining in Hospital at end of 1939	All Cases including both In- and Out-Patients
53.	Appendicitis	1	6	7	1	...	13
54.	Hernia and intestinal obstruction	16	165	181	8	7	446
55.	Cirrhosis of the liver	...	8	8	2	1	20
56.	Other diseases of the liver and biliary passages	1	10	11	1	...	82
57.	Other diseases of the digestive system	5	170	175	10	1	13,517
58.	Nephritis (all forms)—						
	(*a*) Acute	5	16	21	1	...	64
	(*b*) Chronic	...	19	19	10	...	46
59.	Other non-venereal diseases of the genito-urinary system ...	30	343	373	14	11	2,117
60.	Diseases of pregnancy, child birth and the puerperal state—						
	(*a*) Abortion	...	14	14	1	...	49
	(*b*) Ectopic gestation	...	1	1	...	...	2
	(*c*) Toxæmias of pregnancy	...	7	7	1	...	14
	(*d*) Other conditions of the puerperal state	3	121	124	4	2	445
61.	Diseases of the skin, cellular tissue, bones and organs of locomotion	58	1,246	1,304	23	78	36,318
62.	Congenital malformations and diseases of early infancy—						
	(*a*) Congenital debility (children under one year) ...	...	1	1	1	...	3
	(*b*) Premature birth	...	3	3	1	...	6
	(*c*) Injury at birth	...	...	...	...	...	32
	(*d*) Others	2	1	3	...	...	10
63.	Senility	92	270	362	124	91	1,166
64.	External causes—						
	(*a*) Suicide	...	2	2	...	...	6
	(*b*) Other forms of violence	21	345	366	12	24	8,880
65.	Ill-defined causes	10	66	76	2	5	2,355
66.	Ante-natal and child welfare consultations	...	...	...	...	...	92
	Total	552	4,788	5,340	426	363	113,739
	Examinations						642
	GRAND TOTAL	552	4,788	5,340	426	363	114,381

APPENDIX I

REGISTRATION OF MEDICAL PRACTITIONERS, DENTISTS AND DRUGGISTS.

At the beginning and at the end of the year there were on the Register twenty-five medical practitioners, nine licensed medical practitioners, five dentists and nineteen druggists. Actually resident in the Protectorate at the end of the year there were seventeen registered medical practitioners, nine licensed medical practitioners, one dentist and seventeen druggists, of whom seven registered medical practitioners, seven licensed medical practitioners and three druggists were in Government Service.

APPENDIX II

CONTROL OF OPIUM.

The following are the particulars regarding opium addicts:—

	1937.		1938.		1939	
	M.	F.	M.	F.	M.	F.
Number of opium addicts remaining from the previous year ...	39	16	33	15	32	14
Number of applications for permits during the year ...	2	1	4	—	20	3
Number of permits granted during the year ...	2	1	4	—	20	2
Number of permits refused during the year ...	—	—	—	—	—	1
Number of permits cancelled:—						
(a) Owing to death ...	—	—	3	1	2	—
(b) Owing to other cause ...	—	—	2	—	—	—
Number of opium addicts remaining at the end of the year ...	33	15	32	14	50	16
	ozs.		ozs.		ozs.	
Amount of opium issued to addicts during the year ...	360.3		333.5		350.2	
	Shs.	Cts.	Shs.	Cts.	Shs.	Cts.
Amount received in payment for opium issued ...	3,603	00	3,335	34	3,502.00	

The increase in the number of addicts is a result of the war. Because of it people have not been able to obtain poppy heads and seeds from which they made an infusion and so contracted the opium habit. The importation of poppy seeds has now been prohibited.

APPENDIX III.

ANTI-ANCYLOSTOME MEASURES.

In 1937 the Director of Medical Services drew the attention of the Government to the fact that on a conservative estimate 80 per cent of the population of the Protectorate were infected with ancylostomiasis.

Accordingly, in November 1937, a small sum was voted to be expended on the provision of plant, the necessary labour for the digging of pit latrines and the provision of cement tops; the results obtained were reviewed at the end of the year with a view to deciding whether the work should be undertaken on a large scale.

Satisfactory results were obtained and a sum of £800 was alloted to anti-ancylostome measures in 1938 and a further amount of £500 in 1939.

From the start of the campaign, in 1937, until September 1939, when the work had to be largely abandoned, the following expenditure was incurred: Labour, transport, stores and cement tops for latrines, £1,211.

Method of Approach.—The Mudirias of Mangapwani, Mkokotoni and Chaani in Zanzibar Island were selected as being those most suitable in which to start the campaign, because it is in these areas that infestation with *A. duodenale* is highest, the relatively high rainfall and the heavy red soil in these districts being favourable to the infective stage of the parasite.

One African Sanitary Inspector was posted to each district. For a preliminary three months they walked around the villages telling the inhabitants of the decision of the Government to provide them with free pit latrins. Over 20,000 pamphlets in Kiswahili and in Arabic characters were distributed, dealing with the method of spread of hookworm. The reaction of the natives was at first indifference and then suspicion. A popular belief arose that the provision of pit latrines was the prelude to a tax of some sort. It required time and patience to overcome this conception.

In addition to propaganda work the Sanitary Inspectors were engaged in mapping out each village and collections of huts in various Shehias. This work revealed the fact that villages of large size are rare in Zanzibar Island and that, in the main, population is scattered about in groups of twenty huts or so. This diffusion of the population led to delay when the actual digging work commenced, as time was wasted in the transport of plant from place to place.

Plant and Equipment, Etc.—The original machine for boring pit latrines was an all-metal augur. It proved unsatisfactory for this purpose as breakages in the winding gear were frequent and it was very heavy. In addition it cost £22-10-0. An augur bottom made by the Public Works Department was then put into use, mangrove-poles being used for the tripod and ropes and pulleys replaced the elaborate winding gear. This machine was thoroughly successful and practically no breakages of any kind were experienced. The cost of the unit was under £10.

Various experiments were carried out to provide a suitable slab to place on the pit latrine when dug. Metal tops were excluded by their high cost, wooden ones by their liability to decay and to be eaten by termites. "Terrolas" (a tar emulsion) was tried, but it was not successful as it would not dry unless heavily compressed. Eventually a concerete top that measured thirty inches by thirty inches was used and it proved very satisfactory, the only drawback being weight. The average cost per top was Shs. 2/75 cts.

Progress.—It was ascertained by the Sanitary Inspectors that the communal type of latrine was unacceptable to the local people, except in the very few instances where two or three members of the same family lived in adjoining houses. Therefore one latrine per house had to be provided. At the beginning of operations latrines were only dug for those people who expressed a desire for them, in the hope that others would follow suit. This was unsuccessful as in this way many of the villages and hamlets were left with a very small percentage of houses equipped with latrines. When the labourers moved on to another village the holes in the previous village were often left as they had been dug, the owners not even troubling to put the slabs with which they had been provided over the holes.

This method being unsuccessful the following system was evolved. As soon as a village had been surveyed by a Sanitary Inspector, and the position of the huts marked out, a gang of labourers with their machines (usually five), with three men to each machine came to the village and started boring operations.

Every village was found to contain certain sites where the borer was rendered inoperable owing to the rockiness of the soil. When this occurred the owner was provided with crow-bars and instructed to dig his own pit. When each hut in the village had been provided with a pit the Sanitary Inspector showed the owners how to place the slabs on their pits and to construct shelters

over the completed latrines. Until every latrine in that village had been completed no further digging was done in other villages. In this way the Sanitary Inspector was able to devote his whole time to urging the owners to place their slabs in position, complete their digging in the case of those doing it themselves and to proceed with the erection of the shelters, no mean undertakng; an immense amount of time was wasted in the supervising of these three essentials. In many cases the people refused point-blank to do the work, or else offerred varying excuses for postponing it. It came to such a state of deadlock that it was necessary to summon a few people before the native authority. This had excellent results.

Legislation was also enacted (Government Notice No. 38—The Provincial Administration and Authority Decree) Construction of Pit Latrines Order, 1939, making it compulsory for individuals to provide themselves with latrines. This proved successful. At least one visit per week, and often two, was paid by the Medical Officer in Charge to the areas where digging was in progress. The completed latrines were then entered on the maps of the villages.

The relative advantages of pits dug by the borer and those dug by the owners themselves were that the depth aimed at with the boring machine was sixteen feet; it is seldom that a greater depth of soil exists in Zanzibar. Such a hole had a diameter of eighteen inches. Under the system employed each gang of three men dug two holes in a day, and this meant Shs. 1/12 per hole. The average cost of the concrete top, as stated previously, was Shs. 2/75 making the total cost of a latrine dug in this manner about Shs. 3/85.

Individuals digging their own pits received a remuneration usually of 50 cents to Shs. 1/50, the total cost in this case being about Shs. 3/50.

At first sight it would appear as if this were the better method, as the saving involved in the digging of thousands of pits would be considerable. In practice it was not so for, in the majority of cases, it was not possible to get a hole dug of a greater depth than 12 feet and such holes had not a uniform diameter for their whole depth. But the chief drawback to having holes dug in this manner was the length of time which elapsed before the pit was completed. The owner generally put in as little work per day on the hole as he could, only digging when the Sanitary Inspector was in the vicinity. Thus an enormous amount of the Sanitary Inspector's time was wasted, together of course with the time of the visiting Medical Officer.

Using the borer, two completed holes were assured per gang per day, and the Sanitary Inspector was left only with the task of urging the owner to fix his slab in place and to build the necessary shelter.

Various other factors contributed to slowing up progress. These, which are inevitable, include sandy soil which caused the pits to collapse as soon as they were dug. Fortunately soil of this nature was only encountered in a few areas, and the difficulty was overcome by revetting the pits with locally made bamboo baskets at a cost of 50 cents each.

Another difficulty was the presence of subsoil water in certain places at all times of the year. In one area, in Mangapwani Shehia, subsoil water was struck at a depth of three feet from the surface. In these circumstances other sites were tried as near as possible to the houses concerned and the pit was dug to the maximum depth possible. These pits were often found to require revetting in a manner similar to those in sandy soil. A third factor tending to retard the progress of the work was the migratory habits of the population. During the clove harvest the majority of the population goes to Pemba and for some months work is at a standstill. After the rains the men leave the villages and go to cultivate their crops, their gardens often being miles from their homes. It is their practice to sleep in temporary shelters on the spot until cultivation is complete.

It is seen that, in addition to the natural apathy of the population, an ancylostome scheme had to be carried on in the face of inevitable delay caused by harvesting, rains and cultivation. That so much was done is to the credit of the three African Senitary Inspectors employed in the work, whose task was always a difficult one.

All the labourers employed in digging were from the mainland, usually Wanyamwezi, the local native invariably asked for an advance of wages before he would do anything, and in addition viewed the work with distaste as being lowering to his dignity.

The three Mudirias in which pit latrines were dug are Mangapwani, Chaani and Mkokotoni.

1. *Mangapwani Mudiria.*—Every hut in the Shehias of Fujoni, Zingwe-Zingwe and Mangapwani was provided with a pit latrine, the total number of latrines amounting to 1,960.

Comparatively little difficulty was experienced in getting the work done in the first-named Shehias, and only in a very few cases was it necessary to threaten to summons individuals before the native authority. The Masheha in each case were of great assistance to the Sanitary Inspectors, as they regularly accompanied him on his rounds of the villages. The actual digging of the pits presented few obstacles, but in Fujoni some of the pits collapsed after digging and these were revetted with bamboo baskets. In practically every instance the desired depth of sixteen feet was reached. In Mangapwani the rockiness of the soil prohibited more than a small proportion of the holes being dug by the borer. The villagers maintained that the payment of 50 cents was insufficient remuneration for the work involved in digging pits in this soil, and asked for Shs. 3 per hole. Eventually a compromise was reached and Shs. 1/50 was paid to individuals digging in rocky soil.

Owing to the war it became necessary to withdraw the Sanitary Inspector from this area for training as a Non-Commissioned Officer in the Zanzibar Field Ambulance Company. His work was taken over by the Mudir to some extent, and was checked at weekly intervals by the Sanitary Inspector at Mkokotoni.

2. *Chaani Mudiria.*—This Mudiria covers a large area. A total number of 1,882 pit latrines were completed here, about 95 per cent of the total number of huts. In this Mudiria a vast amount of time was wasted in endeavouring to get the inhabitants of some twenty-eight villages to complete their pits and shelters. The total number of pits and shelters involved was only thirty-six and sixty-nine respectively; yet, to get these completed took a period of three months with daily visits by the Sanitary Inspector and weekly or bi-weekly visits by the Medical Officer. It was not a case of antagonism similar to that met with in Mangapwani, but mere passive resistance of the kind so common in Zanzibar. Some people had even to be summoned before the native authority, but in many cases they refused to appear and the majority did not obey orders. These facts were brought to the notice of the Administration.

Subsoil water was the chief difficulty met with in the actual digging, rocky soil being rarer in this area than in the other two.

Doubtless the fact that a large proportion of the population are infected heavily with *A. duodenale* is a contributing factor as regards the apathy of the people in this area.

3. *Mkokotoni Mudiria.*—Every hut in the Shehias of Uyaga and Moga was provided with a pit latrine, and Pitanazako, Mkokotoni and Chutama had a large proportion of the total number of their huts so equipped. In the whole Mudiria 1,971 latrines were completed. Soil of every variety, from dense rock to light sand and high subsoil water were encountered here. Curiously enough, no opposition was met with from the villagers in getting the pits dug in the rocky soil. The area in question was often visited by the Assistant District Commissioner who greatly assisted the Medical Officer and also the Sanitary Inspector.

An interesting fact was that in the village of Kibeni the inhabitants did all the work themselves, without any persuasion on the part of the Sanitary Inspector. Some extremely good shelters were built, one or two of them of concrete, a striking contrast to the usual experience.

Like Mangapwani, this area suffered from the fact that the Sanitary Inspector had to be removed to Zanzibar to begin war training. His relief had to be transferred to town later to take up other duties before the work could be completed.

Conclusion.—It will be seen that over a period of twenty-one months nearly 6,000 pit latrines were dug and brought into use. Considering the difficulties in the way of this scheme, which have been detailed, the results are satisfactory.

At the same rate of progress, i.e. 5,813 latrines in twenty-one months, it would take about twelve years to complete the balance of 43,000 latrines which it is estimated remain to be dug in Zanzibar and Pemba. The cost involved would be about £13,000. But with double the number of Sanitary Inspectors available for secondment to this work, and they are now in training, and with adequate help from the Admnistration Authorites, there is no doubt that this period would be reduced to less than half.

Clearly it is not work for a technical department to do more than to advise on the type of latrine required and to see that the requirements are adhered to. Previous mention has been made of the enormous waste of the time involved when the Medical Officer and the Sanitary Inspector have to walk daily round the same areas urging the people to complete the work. This should be left properly to the junior staff of the Administration Department. The Sanitary Inspectors' work should be confined to propaganda, surveying of villages and giving advice on the actual digging. He would, in addition, be able to supervise his own labourers with a natural increase in the daily output of work.